Name:

at1119paper: Complete the Square, b = odd (v514)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 47x = -442$$

Add $\left(\frac{-47}{2}\right)^2$, which equals $\frac{2209}{4}$, to both sides of the equation.

$$x^2 - 47x + \frac{2209}{4} = \frac{441}{4}$$

Factor the left side.

$$\left(x + \frac{-47}{2}\right)^2 = \frac{441}{4}$$

Undo the squaring.

$$x + \frac{-47}{2} = \frac{-21}{2} \quad \text{or} \quad x + \frac{-47}{2} = \frac{21}{2}$$
$$x = \frac{47 - 21}{2} \quad \text{or} \quad x = \frac{47 + 21}{2}$$
$$x = 13 \quad \text{or} \quad x = 34$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 31x = -58$$

$$x^2 - 31x + \frac{961}{4} = \frac{729}{4}$$
$$\left(x + \frac{-31}{2}\right)^2 = \frac{729}{4}$$

$$x + \frac{-31}{2} = \frac{-27}{2} \quad \text{or} \quad x + \frac{-31}{2} = \frac{27}{2}$$
$$x = \frac{31 - 27}{2} \quad \text{or} \quad x = \frac{31 + 27}{2}$$
$$x = 2 \quad \text{or} \quad x = 29$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 43x = -456$$

$$x^2 + 43x + \frac{1849}{4} = \frac{25}{4}$$

$$\left(x + \frac{43}{2}\right)^2 = \frac{25}{4}$$

$$x + \frac{43}{2} = \frac{-5}{2} \quad \text{or} \quad x + \frac{43}{2} = \frac{5}{2}$$

$$x = \frac{-43-5}{2} \quad \text{or} \quad x = \frac{-43+5}{2}$$

$$x = -24 \quad \text{or} \quad x = -19$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 7x = 450$$

$$x^2 + 7x + \frac{49}{4} = \frac{1849}{4}$$

$$\left(x + \frac{7}{2}\right)^2 = \frac{1849}{4}$$

$$x + \frac{7}{2} = \frac{-43}{2} \quad \text{or} \quad x + \frac{7}{2} = \frac{43}{2}$$

$$x = \frac{-7-43}{2} \quad \text{or} \quad x = \frac{-7+43}{2}$$

$$x = -25 \quad \text{or} \quad x = 18$$